

WHAT IS CLAIMED IS:

1. An occlusion device, for implantation within a tubular structure in the body comprising:

an occluding member, enlargeable from a reduced cross section to an enlarged cross section; and

a stabilizing member, enlargeable from a reduced cross section to an enlarged cross section.

2. An occlusion device as in Claim 1, wherein the enlarged cross section of the stabilizing member is less than the enlarged cross section of (the occlusion member.)

3. An occlusion device as in Claim 1, further comprising a hub between the occlusion member and the stabilizing member.

4. An occlusion device as in Claim 1, wherein the occlusion member comprises an expandable frame.

5. An occlusion device as in Claim 4, wherein the frame comprises at least two spokes.

6. An occlusion device as in Claim 5, wherein at least one spoke has a first end and a second end, and the first end is attached to the hub.

7. An occlusion device as in Claim 1, wherein the stabilizing member comprises at least two elements which are movable from an axial orientation when the stabilizing member is in the reduced cross section to an inclined orientation when the stabilizing element is in the enlarged cross section.

8. An occlusion device as in Claim 7, wherein each element comprises a proximal section, a distal section, and a bend in between the proximal and distal sections when the stabilizing member is in the enlarged cross section.

9. An occlusion device as in Claim 7, wherein the elements comprise wire.

10. An occlusion device as in Claim 7, wherein the elements are cut from a tube.

11. An occlusion device as in Claim 1, further comprising at least one tissue attachment element on the occluding member or the stabilizing member or both.

12. An occlusion device as in Claim 11, wherein (the tissue attachment structure) comprises a tissue piercing element.

13. An occlusion device for occluding a tubular body structure, comprising:
a body, having a longitudinal axis;
an expandable occlusion member at a first position on the axis; and
a stabilizing member at a second position on the axis;
- 5 wherein the occlusion member comprises a plurality of spokes which are
hingably attached to the body and movable between an axial orientation and an
inclined orientation.
14. An occlusion device as in Claim 13, further comprising a membrane or
mesh carried by the spokes.
- 10 15. An occlusion device as in Claim 13, wherein the stabilizing member
comprises at least three radially outwardly moveable elements.
16. An occlusion device as in Claim 15, wherein the elements comprise
flexible metal.
- 15 17. An occlusion device as in Claim 13, further comprising a hinge on the
body between the occlusion member and the stabilizing member.
18. An occlusion device as in Claim 17, wherein the hinge comprises a coil.
19. A method of making an occlusion device, comprising the steps of:
providing a tube having a first end, a second end, and a longitudinal axis;
forming a plurality of axially extending slots at a first position on the
20 tube to create a first plurality of longitudinal elements; and
forming a second plurality of axially extending slots at a second position
on the tube to create a second plurality of longitudinal elements.
- 25 20. A method as in Claim 19, further comprising the step of providing a
radially outwardly directed bias on at least one of the first and second plurality of
elements.
21. A method as in Claim 19, further comprising the step of attaching a
membrane or mesh to at least one of the first and second plurality of elements.
22. A method as in Claim 19, further comprising the step of providing a
hinge on the tube in between the first and second plurality of elements.
- 30 23. A method as in Claim 22, wherein the providing a hinge step comprises
providing a spiral cut in the tube.

24. A method as in Claim 19, wherein the forming step comprises cutting with a laser or etching.

25. A method of occluding an atrial appendage, comprising the steps of:
introducing a stabilizing member into the appendage, for resisting
5 compression of the appendage wall; and
positioning an occlusion member across the appendage.

26. A method of occluding an atrial appendage as in Claim 25, wherein the introducing step comprises introducing a radially expandable stabilizing member and radially expanding the member within the appendage.

10 27. A method of occluding an atrial appendage as in Claim 25, wherein the positioning step comprises positioning the occlusion member within the appendage.

28. A method of occluding an atrial appendage as in Claim 25, wherein the positioning step comprises positioning the occlusion member across an opening of the appendage.

15 29. A method of occluding an atrial appendage as in Claim 25, wherein the introducing and positioning steps are accomplished by introducing a deployment catheter within the appendage and deploying the stabilizing member and occluding member from the catheter.

20 30. A method of occluding an atrial appendage as in Claim 25, further comprising the step of facilitating cell growth onto the occlusion member.

31. A method of occluding an atrial appendage, comprising the steps of:
inhibiting changes in the volume of the appendage; and
occluding the opening to the appendage.

25 32. A method of occluding an atrial appendage as in Claim 31, wherein the inhibiting changes in the volume step comprises introducing a bulking element into the appendage to resist compression of the appendage wall.

33. A method of occluding an atrial appendage as in Claim 32, wherein the introducing step comprises introducing an expandable bulking element into the appendage.

34. A method of occluding an atrial appendage as in Claim 33, wherein the introducing an expandable bulking element comprises deploying a self expandable bulking element from a deployment catheter.

35. A method of occluding an atrial appendage as in Claim 31, wherein the occluding step comprises positioning an occlusion element to enclose the bulking element within the appendage.

36. A method of facilitating cell growth onto an atrial appendage occlusion device, comprising the steps of:

positioning an occlusion device across the opening of the appendage, the occlusion device having a tissue attachment surface thereon; and

resisting compression of the appendage at least during a tissue attachment period of time.

37. A method of facilitating cell growth as in Claim 36, wherein the resisting step comprises positioning a bulking structure within the appendage.

38. An occlusion device, for occluding a hollow body structure, comprising:

a proximal end, a distal end, and a longitudinal axis extending therethrough;

at least three supports extending between the proximal end and the distal end;

each support comprising an elongate, flexible element which is movable from a first orientation in which the element extends substantially parallel to the axis at no more than a first distance from the axis, to a second orientation in which at least a portion of the element is inclined with respect to the axis and is separated by at least a second distance from the axis which is greater than the first distance.

39. An occlusion device as in Claim 38, comprising at least five supports.

40. An occlusion device as in Claim 38, comprising from about five supports to about twenty supports.

41. An occlusion device as in Claim 38, further comprising a proximal hub at the proximal end and a distal hub at the distal end.

42. An occlusion device as in Claim 41, wherein the supports and the proximal hub and the distal hub are formed from a tube.

43. An occlusion device as in Claim 41, wherein the supports and the proximal hub and the distal hub are formed from a sheet.

5 44. An occlusion device as in Claim 38, further comprising at least one barb
on each support.

45. An occlusion device as in Claim 40, further comprising at least one barb on each of at least two supports.

10 ~~X~~46. An occlusion device as in Claim 38, further comprising a barrier layer
carried by the supports.

47. A method of occluding a hollow body structure, comprising:
providing an occlusion device comprising a proximal end, a distal end,
and a longitudinal axis extending therethrough, and at least three supports
extending between the proximal end and the distal end;

15 positioning the occlusion device within the hollow body structure; and
axially shortening the occlusion device along the longitudinal axis to
radially outwardly advance the supports to engage the hollow body structure.

48. A method of occluding a hollow body structure, comprising:
providing an occlusion device comprising a tubular body having a plurality of axially extending slots which define a plurality of axially extending supports;

positioning the occlusion device within the hollow body structure; and
radially outwardly advancing the supports to engage the hollow body
structure.

25 49. A method of occluding a hollow body structure as in Claim 48, wherein
the radially outwardly advancing step comprises inflating a balloon positioned within
the tubular body.

50. A method of occluding a hollow body structure as in Claim 48, wherein the radially outwardly advancing step comprises axially compressing the tubular body.

51. An occlusion device, for implantation within a tubular structure in the body, comprising:

an occluding member comprising at least three spokes which are movable from a reduced cross-section to an enlarged cross-section, the spokes movable from an axial orientation when the occluding member is in the reduced cross-section to an inclined orientation when the occluding member is in the enlarged cross-section.

52. An occlusion device as in Claim 51, further comprising at least one hub on the occlusion member for holding the spokes.

53. An occlusion device as in Claim 51, wherein the occluding member comprises at least eight spokes.

54. An occlusion device as in Claim 52, wherein at least one spoke has a first end and a second end, and the first end is attached to the hub.

55. An occlusion device as in Claim 51, wherein each spoke comprises a proximal section, a distal section, and a bend in between the proximal and distal sections when the occluding member is in the enlarged cross-section.

56. An occlusion device as in Claim 51, wherein the spokes comprise wire.

57. An occlusion device as in Claim 51, wherein the spokes are cut from a tube.

58. An occlusion device as in Claim 51, further comprising at least one tissue attachment element on the occluding member.

59. An occlusion device as in Claim 58, wherein the tissue attachment structure comprises a tissue piercing element.

60. An occlusion device as in Claim 59, comprising at least one barb on each spoke.